

**NPDES Chronic Toxicity Testing of
Chevron/Cawelo Water District 'Inlet to Reservoir B' Effluent**

Sample collected September 21, 2009

Prepared For:

Chevron ETC
3901 Briarpark BRP 405
Houston, TX 77042

Prepared By:

Pacific EcoRisk
2250 Cordelia Road
Fairfield, CA 94534

October 2009

John F. Frost, PhD

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1. INTRODUCTION

Chevron ETC has contracted Pacific EcoRisk (PER) to perform NPDES compliance evaluations of the chronic toxicity of Chevron USA Inc. and Cawelo Water District (Chevron/Cawelo) effluent. These evaluations consist of performing the following US EPA freshwater chronic toxicity tests:

- 3-brood (6-8-day) survival and reproduction test with the crustacean *Ceriodaphnia dubia*; and
- 7-day survival and growth test with larval fathead minnows (*Pimephales promelas*).

The current round of testing was performed using an effluent sample that was collected on September 21, 2009. In order to assess the sensitivity of the test organisms to chronic toxic stress, reference toxicant tests were also performed. This report describes the performance and results of these effluent and reference toxicant tests.

2. TOXICITY TEST PROCEDURES

The methods used in conducting these tests followed EPA testing manual "Short-Term Methods for Estimating the Chronic Effects of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition" (EPA-821-R-02-013).

2.1 Sample Receipt and Handling

On September 21, Precision Analytical staff collected a sample of effluent into an appropriately cleaned sample containers. This sample was transported, on ice and under chain-of-custody, to the PER laboratory in Fairfield. Upon receipt at the testing laboratory, aliquots of the sample were collected for analysis of initial water quality characteristics (Table 1), with the remainder of the sample being stored at 0-6°C except when being used to prepare test solutions. The chain-of-custody records for the collection and delivery of this sample are provided in Appendix A.

Table 1. Initial water quality characteristics of the 'Inlet to Reservoir B' effluent sample.

Sample Receipt Date	Sample ID	Temp (°C)	pH	D.O. (mg/L)	Alkalinity (mg/L)	Hardness (mg/L)	Conductivity (µS/cm)	Total Ammonia (mg/L N)
9/21/09	#1	10.7 ^a	6.85	4.8	198	76	794	<1.0

a - This sample was transported and delivered on the day of sample collection.

2.2 Survival and Reproduction Toxicity Testing with *Ceriodaphnia dubia*

The short-term chronic *Ceriodaphnia* test consists of exposing individual females to effluent for the length of time it takes for the Lab Control treatment females to produce 3 broods (typically 6-8 days), after which effects on survival and reproduction are evaluated. The specific procedures used in this test are described below.

The Lab Water Control treatment for this test consisted of an 80:20 mixture of de-ionized water with commercial spring water (Perrier). The Lab Water and the effluent sample were used to prepare test solutions at the 12.5, 25, 50, 75, and 100% effluent concentrations. For each treatment, 200 mL of test solution was amended with the alga *Selenastrum capricornutum* and Yeast-Cerophyll®-Trout Food (YCT) to provide food for the test organisms. "New" water quality characteristics (pH, D.O., and conductivity) were measured on these food-amended test solutions prior to use in this test. Each day of the test, fresh test solutions and a "new" set of replicate cups were prepared and characterized, as before.

There were 10 replicates for each test treatment, each replicate consisting of 15 mL of test solution in a 30-mL plastic cup. This "3-brood" test was initiated by allocating one neonate (<24 hrs old) *Ceriodaphnia*, obtained from ongoing laboratory cultures, into each replicate. The replicate cups were placed into a temperature-controlled room at 25°C, under cool-white fluorescent lighting on a 16L:8D photoperiod.

Each test replicate cup was examined daily, with surviving "original" individual organisms being transferred to the corresponding new cup containing fresh test solution. The contents of each remaining "old" replicate cup were carefully examined, and the number of neonate offspring produced by each original organism was determined, after which "old" water quality characteristics (pH, D.O., and conductivity) were measured for the old media from one randomly-selected replicate at each treatment.

After it was determined that ≥ 60% of the *Ceriodaphnia* in the Lab Water Control treatment had produced their third brood of offspring, the test was terminated. The resulting survival and reproduction (number of offspring) data were analyzed to evaluate any impairment(s) caused by the effluent; all statistical analyses were performed using the CETIS® statistical software.

2.2.1 Reference Toxicant Testing of the *Ceriodaphnia dubia*

In order to assess the sensitivity of the *Ceriodaphnia* test organisms to toxic stress, a reference toxicant test was performed. The reference toxicant test was performed similarly to the effluent test except that test solutions consisted of Lab Control water spiked with NaCl at test concentrations of 250, 500, 1000, 1500 and 2000 mg/L. The resulting test response data were statistically analyzed to determine key dose-response point estimates (e.g., EC₅₀); all statistical analyses were made using the CETIS® software. These response endpoints were then compared

to the typical response range established by the mean \pm 2 SD of the point estimates generated by the most recent previous reference toxicant tests performed by this lab.

2.3 Survival and Growth Toxicity Testing with Larval Fathead Minnows

The chronic fathead minnow test consists of exposing larval fish to effluent for 7 days, after which effects on survival and growth are evaluated. The specific procedures used in this test are described below.

The Lab Water Control treatment for this test consisted of US EPA synthetic moderately-hard water. The Lab Water and the effluent sample were used to prepare daily test solutions at the 12.5, 25, 50, 75, and 100% effluent concentrations. "New" water quality characteristics (pH, D.O., and conductivity) were measured on these test solutions prior to use in the test.

There were 4 replicates at each test treatment, each replicate consisting of 400 mL of test media in a 600-mL glass beaker. This test was initiated by randomly allocating 10 larval fathead minnows (<48 hrs old) into each replicate. The replicate beakers were placed in a temperature-controlled room at 25°C, under cool-white fluorescent lighting on a 16L:8D photoperiod. The test fish were fed brine shrimp nauplii thrice daily.

Each replicate was examined daily, with any dead animals, uneaten food, wastes, and other detritus being removed. The number of live fish in each replicate was determined and then approximately 80% of the test media in each beaker was carefully poured out and replaced with fresh test solution. "Old" water quality characteristics (pH, D.O., and conductivity) were measured on the old test water that had been discarded from one randomly-selected replicate at each treatment.

After 7 days exposure, the number of live fish in each replicate beaker was recorded. The fish from each replicate were then carefully euthanized in methanol, rinsed in de-ionized water, and transferred to a pre-dried and pre-tared weighing pan. These fish were then dried at 100°C for >24 hrs and re-weighed to determine the total weight of fish in each replicate; the total weight was then divided by the initial number of fish per replicate ($n=10$) to determine the "biomass value". The resulting survival and growth ("biomass value") data were analyzed to evaluate any impairment(s) caused by the effluent; all statistical analyses were performed using the CETIS® statistical software.

2.3.1 Reference Toxicant Testing of the Larval Fathead Minnows

In order to assess the sensitivity of the fish to toxic stress, a reference toxicant test was performed. The reference toxicant test was performed similarly to the effluent test, except that test solutions consisted of Lab Control water spiked with NaCl at test concentrations of 0.75, 1.5, 3, 6, and 9 gm/L. The resulting test response data were analyzed to determine key dose-response point estimates (e.g., EC₅₀); all statistical analyses were made using the CETIS® software. These

response endpoints were then compared to the 'typical response' range established by the mean \pm 2 SD of the point estimates generated by the 20 most recent previous reference toxicant tests performed by this lab.

3. RESULTS

3.1 Chronic Effects of the Chevron/Cawelo Effluent on *Ceriodaphnia dubia*

The results of this test are summarized below in Table 2. There was 90% survival at the Lab Water Control treatment. There were no significant reductions in survival in the effluent; the survival NOEC was 100% effluent, resulting in 1.0 TUC (where TUC = 100/NOEC).

There was a mean of 21.1 offspring per female at the Lab Water Control treatment. There were significant reductions in reproduction; the reproduction NOEC was 50% effluent, resulting in 2.0 TUC (where TUC = 100/NOEC).

The test data and summary of statistical analyses for this test are presented in Appendix B.

Table 2. Effects of the effluent on *Ceriodaphnia dubia* survival and reproduction.

Effluent Treatment	% Survival	Reproduction (# neonates /female)
Lab Water Control	90	21.1
12.5%	90	20.8
25%	100	22.5
50%	100	16.7
75%	90	7.8*
100%	100	3.6*
Summary of Statistics		
No Observable Effect Concentration (NOEC) =	100% effluent	50% effluent
TUC (where TUC = 100/NOEC) =	1.0	2.0
Survival EC25 or Reproduction IC25 =	>100% effluent ^a	51.4% effluent
Survival EC50 or Reproduction IC50 =	>100% effluent ^a	65.6% effluent

* Significantly less than the Lab Control treatment response at p < 0.05.

a - Due to the absence of significant mortalities, the EC point estimates could not be calculated, but can be assumed to be >100% effluent.

3.1.1 Reference Toxicant Toxicity to *Ceriodaphnia dubia*

The results for this test are summarized below in Table 3. There was 90% survival and a mean of 22.4 offspring in the Lab Control treatment. The survival EC₅₀ was 1730 mg/L NaCl, and the reproduction IC₅₀ was 993 mg/L NaCl.

The results for the reference toxicant test were consistent with the "typical response" ranges established by the mean \pm 2 SD of the point estimates generated by the most recent previous reference toxicant tests performed by this lab, indicating that these test organisms were responding to toxic stress in a typical fashion.

The test data and summary of statistical analyses for this test are presented in Appendix E.

Table 3. Reference toxicant testing: effects of NaCl on *Ceriodaphnia dubia*.

NaCl Treatment (mg/L)	% Survival	Reproduction (# neonates/female)
Lab Control	90	22.4
250	100	20.6
500	100	21.3
1000	90	11.1*
1500	100	7.6*
2000	0*	0.0

Summary of Statistics

Survival EC ₅₀ or Reproduction IC ₅₀ =	1730 mg/L NaCl	993 mg/L NaCl
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* Significantly less than the Lab Control treatment response ($p < 0.05$).

3.2 Chronic Effects of the Chevron/Cawelo Effluent on Fathead Minnows

The results of this test are summarized below in Table 4. There was 100% survival at the Lab Water Control treatment. There were significant reductions in survival in the effluent; the NOEC was <12.5% effluent, resulting in >8.0 TUC (where TUC = 100/NOEC).

There was a mean 'biomass value' of 0.38 mg at the Lab Water Control treatment. The growth NOEC was also <12.5% effluent, resulting in >8.0 TUC (where TUC = 100/NOEC).

The test data and the summary of statistical analyses for this test are presented in Appendix D.

Table 4. Effects of the effluent on fathead minnow survival and growth.

Effluent Treatment	% Survival	Mean Fish Biomass Value (mg)
Lab Water Control	100	0.38
12.5%	67.5*	0.23
25%	47.5*	0.10
50%	0*	-
75%	0*	-
100%	0*	-
Summary of Statistics		
No Observable Effect Concentration (NOEC) =	<12.5% effluent	<12.5% effluent
TUC (where TUC = 100/NOEC) =	>8.0	>8.0
Survival EC25 or Growth IC25 =	12.7% effluent	4.0% effluent
Survival EC50 or Growth IC50 =	18.8% effluent	15.2% effluent

* Significantly less than the Lab Water Control treatment response at p < 0.05.

3.2.1 Reference Toxicant Toxicity to Fathead Minnows

The results of this test are summarized below in Table 7. There was 75% survival and a mean biomass value of 0.25 mg at the Lab Control treatment. The survival EC₅₀ was 4.4 gm/L NaCl and the growth IC₅₀ was 3.8 gm/L NaCl.

The results for the reference toxicant test were consistent with the "typical response" ranges established by the mean \pm 2 SD of the point estimates generated by the most recent previous reference toxicant tests performed by this lab, indicating that these test organisms were responding to toxic stress in a typical fashion.

The test data and summary of statistical analyses for this test are presented in Appendix G.

Table 7. Reference toxicant testing: effects of NaCl on fathead minnows.

NaCl Treatment (gm/L)	% Survival	Mean Fish Biomass Value (mg)
Lab Control	75	0.25
0.75	82.5	0.28
1.5	80	0.28
3	65	0.17*
6	17.5*	0.07
9	0*	0.0

Summary of Statistics

Survival EC ₅₀ or Growth IC ₅₀ =	4.4 gm/L NaCl	3.8 gm/L NaCl
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* Significantly less than the Lab Control treatment response ($p < 0.05$).

4. SUMMARY AND CONCLUSIONS

Chronic Effects of Chevron/Cawelo Effluent on *Ceriodaphnia dubia*

There were no significant reductions in survival in the effluent; the survival NOEC was 100% effluent. There were significant reductions in reproduction; the reproduction NOEC was 50% effluent, resulting in 2.0 TUC (where TUC = 100/NOEC).

Chronic Effects of Chevron/Cawelo Effluent on Fathead Minnows

There were significant reductions in survival in the effluent; the NOEC was <12.5% effluent, resulting in >8.0 TUC (where TUC = 100/NOEC). The reproduction NOEC was also <12.5% effluent, resulting in >8.0 TUC (where TUC = 100/NOEC).

4.1 QA/QC Summary

Test Conditions – All test conditions (pH, D.O., temperature, etc.) were all within acceptable limits for these tests. All analyses were performed according to laboratory Standard Operating Procedures.

Negative Lab Control – The biological responses in the Lab Water Control treatments for the effluent tests were within acceptable limits.

Positive Control – The results for the reference toxicant tests were consistent with the reference toxicant test database, indicating that these test organisms were responding to toxic stress in a typical fashion.

Concentration Response Relationships – There were valid concentration-response relationships for the reference toxicant tests, which were determined to be acceptable for this testing.

Appendix A

Chain-of-Custody Record for the Collection and Delivery of the Chevron/Cawelo 'Inlet to Reservoir B' Effluent Sample

CHAIN OF CUSTODY RECORD

PACIFIC ECORISK
22250 Cordelia Rd.
Fairfield, CA 94534
Ph: (707) 207-7760
Fax: (707) 207-7916
www.pacificcorisk.com

RESULTS TO:

BILL NO:

CYSTITIS GULDE
CITRON CORP.

Attn: _____ Phone: _____ Email: _____

PROJECT:

ANALYSES REQUESTED

Appendix B

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of Chevron/Cawelo 'Inlet to Reservoir B' Effluent to *Ceriodaphnia dubia*

CETIS Summary Report

Report Date:

22 Oct-09 12:28 (p 1 of 2)

Test Code:

19-2187-6025/36404

Ceriodaphnia Survival and Reproduction Test Pacific EcoRisk

Batch ID:	02-8867-6782	Test Type:	Reproduction-Survival (7d)	Analyst:	Jason Walker
Start Date:	22 Sep-09 18:15	Protocol:	EPA-821-R-02-013 (2002)	Diluent:	Laboratory Water
Ending Date:	28 Sep-09 15:45	Species:	Ceriodaphnia dubia	Brine:	Not Applicable
Duration:	5d 22h	Source:	In-House Culture	Age:	1

Sample ID:	01-6761-3775	Code:	Eff	Client:	Precision Analytical
Sample Date:	21 Sep-09 10:00	Material:	Effluent	Project:	15239
Receive Date:	21 Sep-09 18:00	Source:	Precision Analytical		
Sample Age:	32h (10.7 °C)	Station:	Inlet Resv B		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
17-1983-8824	Reproduction	50	75	61.2	31.3%	2	Steel Many-One Rank Test
15-0358-2513	Survival	100	>100	N/A	N/A	1	Fisher Exact/Bonferroni-Holm Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
20-6386-6485	Reproduction	IC5	29.3	0.806	50.2	3.42	Linear Interpolation (ICPIN)
		IC10	34.2	2.26	52.2	2.92	
		IC15	40	4.89	53.8	2.5	
		IC20	46.7	9.64	55.6	2.14	
		IC25	51.4	26.6	57.8	1.95	
		IC40	59.5	45.9	65	1.68	
		IC50	65.6	55.9	71.3	1.52	

Reproduction Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	10	21.1	17.5	24.7	0	31	1.76	9.64	45.7%	0.0%
12.5		10	20.8	17.2	24.4	2	32	1.74	9.53	45.8%	1.42%
25		10	22.5	20.8	24.2	15	29	0.818	4.48	19.9%	-6.64%
50		10	16.7	14.5	18.9	9	23	1.09	5.96	35.7%	20.9%
75		10	7.8	6.82	8.78	5	13	0.478	2.62	33.5%	63.0%
100		10	3.6	2.91	4.29	0	7	0.336	1.84	51.1%	82.9%

Survival Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	10	0.9	0.782	1	0	1	0.0577	0.316	35.1%	0.0%
12.5		10	0.9	0.782	1	0	1	0.0577	0.316	35.1%	0.0%
25		10	1	1	1	1	1	0	0	0.0%	-11.1%
50		10	1	1	1	1	1	0	0	0.0%	-11.1%
75		10	0.9	0.782	1	0	1	0.0577	0.316	35.1%	0.0%
100		10	1	1	1	1	1	0	0	0.0%	-11.1%

CETIS Summary Report

Report Date:

22 Oct-09 12:28 (p 2 of 2)

Test Code:

19-2187-6025/36404

Ceriodaphnia Survival and Reproduction Test

Pacific EcoRisk

Reproduction Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	0	26	25	27	25	13	28	24	31	12
12.5		14	25	13	27	2	25	26	30	32	14
25		15	15	25	21	23	24	24	26	29	23
50		11	9	11	21	22	19	19	23	23	9
75		9	5	8	13	5	6	8	9	10	5
100		0	2	4	4	3	3	4	7	5	4

Survival Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	0	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	0	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
75		1	1	1	1	1	1	1	1	1	0
100		1	1	1	1	1	1	1	1	1	1

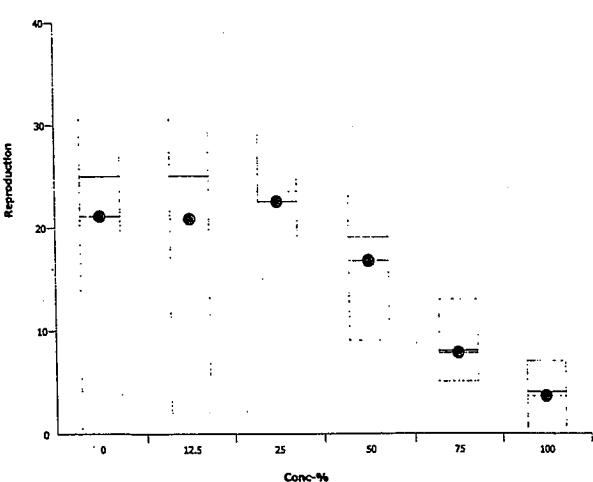
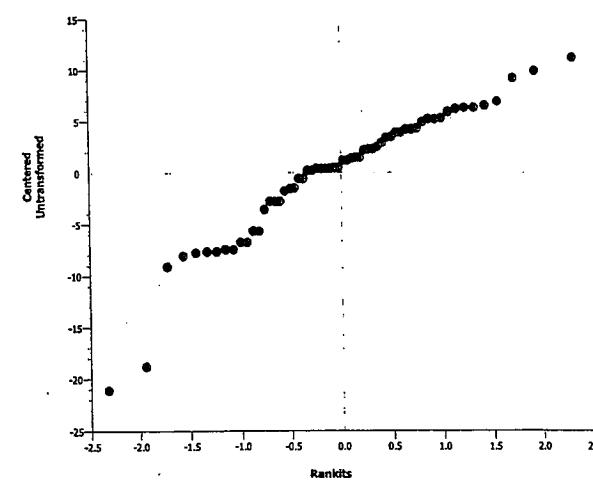
CETIS Analytical Report

Report Date: 22 Oct-09 12:28 (p 1 of 1)
 Test Code: 19-2187-6025/36404.

Ceriodaphnia Survival and Reproduction Test						Pacific EcoRisk						
Analysis ID:	15-0358-2513	Endpoint: Survival			CETIS Version:	CETISv1.7.0						
Analyzed:	22 Oct-09 12:28	Analysis: STP 2x2 Contingency Tables			Official Results:	Yes						
Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU					
Untransformed		C > T	Not Run	100	>100	N/A	1					
Fisher Exact/Bonferroni-Holm Test												
Control	vs	Conc-%	Test Stat	P-Value	Decision(0.05)							
Lab Water Control		12.5	0.763	1.0000	Non-Significant Effect							
		25	1	1.0000	Non-Significant Effect							
		50	1	1.0000	Non-Significant Effect							
		75	0.763	1.0000	Non-Significant Effect							
		100	1	1.0000	Non-Significant Effect							
Data Summary												
Conc-%	Control Type	No-Resp	Resp	Total								
0	Lab Water Cont	9	1	10								
12.5		9	1	10								
25		10	0	10								
50		10	0	10								
75		9	1	10								
100		10	0	10								
Graphics												

CETIS Analytical Report

Report Date: 22 Oct-09 12:28 (p 1 of 1)
 Test Code: 19-2187-6025/36404

Ceriodaphnia Survival and Reproduction Test							Pacific EcoRisk				
Analysis ID: 17-1983-8824	Endpoint: Reproduction					CETIS Version: CETISv1.7.0					
Analyzed: 22 Oct-09 12:28	Analysis: Nonparametric-Control vs Treatments					Official Results: Yes					
Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU				
Untransformed	0	C > T	Not Run	50	75	61.2	2				
Steel Many-One Rank Test											
Control	vs	Conc-%	Test Stat	Critical	Ties	P-Value	Decision(5%)				
Lab Water Control		12.5	108	75	4	0.8837	Non-Significant Effect				
		25	97.5	75	3	0.6152	Non-Significant Effect				
		50	77	75	0	0.0654	Non-Significant Effect				
		75*	66.5	75	1	0.0080	Significant Effect				
		100*	64.5	75	1	0.0050	Significant Effect				
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)					
Between	3107.483	621.4966	5	14.9	<0.0001	Significant Effect					
Error	2247.1	41.61296	54								
Total	5354.583	663.1096	59								
ANOVA Assumptions											
Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)						
Variances	Bartlett Equality of Variance	31.2	15.1	<0.0001	Unequal Variances						
Distribution	Shapiro-Wilk Normality	0.926		0.0013	Non-normal Distribution						
Reproduction Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	10	21.1	17.4	24.8	0	31	1.79	9.64	45.7%	0.0%
12.5		10	20.8	17.2	24.4	2	32	1.77	9.53	45.8%	1.42%
25		10	22.5	20.8	24.2	15	29	0.832	4.48	19.9%	-6.64%
50		10	16.7	14.4	19	9	23	1.11	5.96	35.7%	20.9%
75		10	7.8	6.8	8.8	5	13	0.486	2.62	33.5%	63.0%
100		10	3.6	2.9	4.3	0	7	0.341	1.84	51.1%	82.9%
Graphics											
											
											

CETIS Analytical Report

Report Date: 22 Oct-09 12:28 (p 1 of 1)
 Test Code: 19-2187-6025/36404

Ceriodaphnia Survival and Reproduction Test						Pacific EcoRisk					
Analysis ID: 20-6386-6485 Analyzed: 22 Oct-09 12:28	Endpoint: Reproduction Analysis: Linear Interpolation (ICPIN)			CETIS Version: CETISv1.7.0 Official Results: Yes							
Linear Interpolation Options											
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method						
Log(X+1)	Linear	57951	200	Yes	Two-Point Interpolation						
Point Estimates											
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL					
IC5	29.3	0.806	50.2	3.42	1.99	124					
IC10	34.2	2.26	52.2	2.92	1.92	44.2					
IC15	40	4.89	53.8	2.5	1.86	20.5					
IC20	46.7	9.64	55.6	2.14	1.8	10.4					
IC25	51.4	26.6	57.8	1.95	1.73	3.75					
IC40	59.5	45.9	65	1.68	1.54	2.18					
IC50	65.6	55.9	71.3	1.52	1.4	1.79					
Reproduction Summary						Calculated Variate					
Conc-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	Diff%		
0	Lab Water Contr	10	21.1	0	31	1.76	9.64	45.7%	0.0%		
12.5		10	20.8	2	32	1.74	9.53	45.8%	1.42%		
25		10	22.5	15	29	0.818	4.48	19.9%	-6.64%		
50		10	16.7	9	23	1.09	5.96	35.7%	20.9%		
75		10	7.8	5	13	0.478	2.62	33.5%	63.0%		
100		10	3.6	0	7	0.336	1.84	51.1%	82.9%		
Reproduction Detail											
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Control	0	26	25	27	25	13	28	24	31	12
12.5		14	25	13	27	2	25	26	30	32	14
25		15	15	25	21	23	24	24	26	29	23
50		11	9	11	21	22	19	19	23	23	9
75		9	5	8	13	5	6	8	9	10	5
100		0	2	4	4	3	3	4	7	5	4
Graphics											

Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data

Client: Precision Analytical - Chevron Cawelo

Project #:

15239

Test ID:

36404

Material: Inlet to Res B

Test Date: 9/22/09

Control Water: Lab Water (80:20)

Day	pH			D.O.			Survival / Reproduction						SIGN-OFF				
	New	Old	New	Old	Cond. ($\mu\text{S}/\text{cm}$)	Temp (°C)	A	B	C	D	E	F	G	H	I	J	
0	8.25	8.7			237	25.9	0	0	0	0	0	0	0	0	0	0	
1	8.20	8.32	9.4	8.8	239	25.8	0	0	0	0	0	0	0	0	0	0	
2	8.14	7.73	8.4	8.2	243	25.7	0	0	0	0	0	0	0	0	0	0	
3	8.09	8.10	8.1	8.3	229	25.9	0	0	0	0	0	0	0	0	0	0	
4	8.14	8.05	8.6	7.1	237	25.8	X/0	7	5	7	6	6	6	6	5	5	
5	7.77	8.20	8.9	8.6	242	26.0	-	6	7	6	5	7	6	7	7	7	
6	8.61	8.19	8.3	8.0	205	25.9	-	13	13	14	14	15	12	17	0	0	
7							-										
8							-										
							Total =	X/1	216	225	227	225	13	228	24	31	12
Day	pH			D.O.			Cond. ($\mu\text{S}/\text{cm}$)	Survival / Reproduction						SAMPLE ID			
0	7.87	8.2			315		0	0	0	0	0	0	0	0	0	0	0
1	7.77	8.40	9.4	8.7	318		0	0	0	0	0	0	0	0	0	0	0
2	8.04	8.07	8.4	8.3	301		0	0	0	0	0	0	0	0	0	0	0
3	7.86	8.35	8.0	6.7	306		0	0	0	0	0	0	0	0	0	0	0
4	7.66	8.75	8.8	7.1	315		6	7	6	6	X/2	6	6	6	6	6	6
5	7.74	8.32	9.1	8.1	309		0	6	7	8	-	8	7	10	11	10	11
6	7.64	8.37	8.3	8.8	277		8	12	0	13	-	11	13	14	15	0	0
7																	
8																	
										</td							

Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data

Client: Precision Analytical - Chevron Cawelo

Material: Inlet to Res B

Test Date: 9/22/09

Project #: 15239

Control Water: Lab Water (80/20)

Test ID: 36404

Randomization: Board 11

	Day	pH		D.O.		Cond. ($\mu\text{S}/\text{cm}$)		Survival / Reproduction								SIGN-OFF
		New	Old	New	Old	A	B	C	D	E	F	G	H	I	J	
	0	7.35	7.7	636	636	0	0	0	0	0	0	0	0	0	0	
	1	7.32	7.55	9.4	8.3	458	0	0	0	0	0	0	0	0	0	
	2	7.44	8.40	7.9	8.3	640	0	0	0	0	0	0	0	0	0	
75%	3	7.44	8.60	7.6	6.9	636	0	0	0	0	0	0	0	0	0	
	4	7.11	8.53	8.9	7.2	643	4	0	0	4	3	3	4	3	3	
	5	7.41	8.54	9.2	8.4	634	0	2	3	2	3	4	5	0	2	
	6	7.15	8.51	8.0	9.0	619	5	0	0	0	0	0	7	10	0	
	7												-			
	8												-			
						Total =	9	5	8	13	5	6	4	9	10	1/5
																Mean Neonates/Female = 7.8
	Day	pH		D.O.		Cond. ($\mu\text{S}/\text{cm}$)		Survival / Reproduction								SIGN-OFF
		New	Old	New	Old	A	B	C	D	E	F	G	H	I	J	
	0	7.20	6.8	766	789	0	0	0	0	0	0	0	0	0	0	
	1	7.24	8.63	9.4	8.3	789	0	0	0	0	0	0	0	0	0	
	2	7.33	8.47	7.6	8.2	774	0	0	0	0	0	0	0	0	0	
100%	3	7.33	8.65	7.6	6.1	768	0	0	0	0	0	0	0	0	0	
	4	7.02	8.60	9.0	7.1	774	0	0	0	0	0	0	0	0	0	
	5	7.36	8.59	8.4	8.5	772	0	1	0	0	0	0	0	0	0	
	6	7.05	8.63	7.6	8.1	773	0	0	4	4	3	3	4	7	5	
	7															
	8															
						Total =	0	2	1	3	3	4	7	5	4	Mean Neonates/Female = 3.6

Appendix C

Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the *Ceriodaphnia dubia*

CETIS Summary Report

Report Date:

26 Oct-09 14:53 (p 1 of 2)

Test Code:

20-4854-3995/36322

Ceriodaphnia Survival and Reproduction Test							Pacific EcoRisk				
Batch ID:	12-7185-1466	Test Type:	Reproduction-Survival (7d)		Analyst:	Drew Gantner					
Start Date:	22 Sep-09 18:00	Protocol:	EPA-821-R-02-013 (2002)		Diluent:	Laboratory Water					
Ending Date:	28 Sep-09 16:20	Species:	Ceriodaphnia dubia		Brine:	Not Applicable					
Duration:	5d 22h	Source:	In-House Culture		Age:	1					
Sample ID:	13-8686-0740	Code:	NaCl		Client:	Pacific Ecorisk					
Sample Date:	22 Sep-09 18:00	Material:	Sodium chloride		Project:	15220					
Receive Date:	22 Sep-09 18:00	Source:	Reference Toxicant								
Sample Age:	N/A (25.6 °C)	Station:	In House								
Comparison Summary											
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method				
10-3222-7684	Reproduction	500	1000	707	25.9%		Steel Many-One Rank Test				
09-7485-3010	Survival	1500	2000	1730	N/A		Fisher Exact/Bonferroni-Holm Test				
Point Estimate Summary											
Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method				
13-6558-7640	Reproduction	IC5	70.4	2.12	544		Linear Interpolation (ICPIN)				
		IC10	529	8.71	607						
		IC15	572	29.3	675						
		IC20	619	93.4	754						
		IC25	670	412	836						
		IC40	848	657	1090						
		IC50	993	820	1270						
16-7083-5348	Survival	EC5	1510	637	1520		Linear Interpolation (ICPIN)				
		EC10	1540	812	1540						
		EC15	1560	1500	1570						
		EC20	1580	1530	1590						
		EC25	1610	1550	1610						
		EC40	1680	1640	1680						
		EC50	1730	1690	1730						
Reproduction Summary											
Conc-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	10	22.4	19.8	25	12	32	1.27	6.96	31.1%	0.0%
250		10	20.6	17.8	23.4	10	31	1.36	7.46	36.2%	8.04%
500		10	21.3	19	23.6	8	28	1.11	6.07	28.5%	4.91%
1000		10	11.1	9.22	13	6	22	0.921	5.04	45.4%	50.4%
1500		10	7.6	6.87	8.33	5	12	0.357	1.96	25.7%	66.1%
2000		10	0	0	0	0	0	0	0		100.0%
Survival Summary											
Conc-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	10	0.9	0.782	1	0	1	0.0577	0.316	35.1%	0.0%
250		10	1	1	1	1	1	0	0	0.0%	-11.1%
500		10	1	1	1	1	1	0	0	0.0%	-11.1%
1000		10	0.9	0.782	1	0	1	0.0577	0.316	35.1%	0.0%
1500		10	1	1	1	1	1	0	0	0.0%	-11.1%
2000		10	0	0	0	0	0	0	0		100.0%

CETIS Summary Report

Report Date:

26 Oct-09 14:53 (p 2 of 2)

Test Code:

20-4854-3995/36322

Ceriodaphnia Survival and Reproduction Test											Pacific EcoRisk
Reproduction Detail											
Conc-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	16	12	27	32	15	16	26	28	24	28
250		10	29	27	31	14	17	25	11	21	21
500		23	24	28	25	8	23	26	14	23	19
1000		7	10	22	10	9	7	15	16	9	6
1500		5	7	8	6	9	12	8	8	6	7
2000		0	0	0	0	0	0	0	0	0	0
Survival Detail											
Conc-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	1	1	1	1	1	0	1	1	1	1
250		1	1	1	1	1	1	1	1	1	1
500		1	1	1	1	1	1	1	1	1	1
1000		0	1	1	1	1	1	1	1	1	1
1500		1	1	1	1	1	1	1	1	1	1
2000		0	0	0	0	0	0	0	0	0	0

Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data

Client: 15220 Reference Toxicant: 36322 Project #: 15220

Material: Sodium Chloride Randomization: 00000 14

Test Date: 9. 21. 09

Control Water: Lab Water (80:20)

Survival / Reproduction												SIGN-OFF						
Day	pH		D.O.		Cond. ($\mu\text{S}/\text{cm}$)		Temp ($^{\circ}\text{C}$)		A	B	C	D	E	F	G	H	I	J
	New	Old	New	Old	New	Old	New	Old										
0	8.07	7.9	7.9	7.9	24.2	25.6	0	0	0	0	0	0	0	0	0	0	0	
1	8.19	8.29	9.2	9.1	234	25.8	0	0	0	0	0	0	0	0	0	0	0	
2	8.10	7.99	8.0	8.8	235	25.7	0	0	0	0	0	0	0	0	0	0	0	
3	8.09	8.32	8.1	6.8	237	25.8	0	0	0	0	0	0	0	0	0	0	0	
4	8.09	8.21	8.7	7.9	239	25.9	5	5	4	7	5	5	5	5	5	5	5	
5	7.95	8.17	8.3	8.4	244	26.0	0	7	8	12	0	0	0	0	0	0	0	
6	7.97	8.21	8.5	9.1	193	26.0	11	13	10	11	12	12	9	13	10	10	10	
7																		
8																		
				Total=	16	12	17	32	15	14	26	28	24	28	Mean Neonates/Female = 22.4			
RT BATCH NUMBER																		
Day	pH	New	Old	D.O.	Cond. ($\mu\text{S}/\text{cm}$)	A	B	C	D	E	F	G	H	I	J			
0	8.06	7.8	7.8	7.83	0	0	0	0	0	0	0	0	0	0	0	21		
1	8.13	8.26	9.4	9.0	745	6	0	0	0	0	0	0	0	0	0	21		
2	8.08	8.07	7.9	8.1	700	0	0	0	0	0	0	0	0	0	0	21		
3	8.11	8.26	8.1	7.0	693	0	0	0	0	0	0	0	0	0	0	21		
4	8.05	8.18	8.9	7.6	773	3	6	6	6	3	7	5	4	5	5	21		
5	7.95	8.15	8.2	8.2	738	0	9	11	10	10	0	8	6	9	8	21		
6	8.02	8.24	8.5	8.3	746	7	14	10	15	9	10	12	0	8	8	21		
7																		
8																		
				Total=	10	262	27	31	14	17	15	11	21	21	Mean Neonates/Female = 20.6			
250 mg/L																		

Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data

Client: _____ Reference Toxicant _____
Project #: 152220 Test ID: 36324

Client: _____ Reference Toxicant _____
Project #: 152220 Test ID: 36324

Material: Sodium Chloride Test Date: 9.11.84
Randomization: Boards A4 Control Water: Lab Water (80:20)

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Mean Neonates/Female

Short-Term Chronic 3-Brood Ceriodaphnia dubia Survival & Reproduction Test DataMaterial: Sodium ChlorideTest Date: 9.22.01

Control Water:

Lab Water (80:20)

Test ID:

36322

Reference Toxicant

D.O.

Cond.

(µS/cm)

Temp

(°C)

A

B

C

D

E

F

G

H

I

J

New

Old

New

Appendix D

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of Chevron/Cawelo 'Inlet to Reservoir B' Effluent to Fathead Minnows

CETIS Summary Report

Report Date: 22 Oct-09 12:16 (p 1 of 2)
 Test Code: 07-9973-5767/36401

Chronic Larval Fish Survival and Growth Test							Pacific EcoRisk				
Batch ID:	12-4203-9463	Test Type:	Growth-Survival (7d)	Analyst:	Jason Walker						
Start Date:	22 Sep-09 18:20	Protocol:	EPA/821/R-02-013 (2002)	Diluent:	Laboratory Water						
Ending Date:	29 Sep-09 09:45	Species:	Pimephales promelas	Brine:	Not Applicable						
Duration:	6d 15h	Source:	Aquatic Biosystems, CO	Age:	1						
Sample ID:	01-6761-3775	Code:	Eff	Client:	Precision Analytical						
Sample Date:	21 Sep-09 10:00	Material:	Effluent	Project:	15239						
Receive Date:	21 Sep-09 18:00	Source:	Precision Analytical								
Sample Age:	32h (10.7 °C)	Station:	Inlet Resv B								
Comparison Summary											
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method				
02-2706-9522	7d Survival Rate	<12.5	12.5	N/A	13.1%	>8	Steel Many-One Rank Test				
12-8095-4102	Mean Dry Biomass-mg	<12.5	12.5	N/A	13.4%	>8	Steel Many-One Rank Test				
10-8855-6617	Mean Dry Weight-mg	12.5	25	17.7	8.94%	8	Steel Many-One Rank Test				
Point Estimate Summary											
Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method				
09-4015-4915	7d Survival Rate	EC5	7.29	4.66	9.59	13.7	Linear Regression (MLE)				
		EC10	8.98	6.15	11.4	11.1					
		EC15	10.3	7.41	12.8	9.67					
		EC20	11.6	8.57	14.1	8.64					
		EC25	12.7	9.71	15.3	7.85					
		EC40	16.2	13.2	19	6.16					
		EC50	18.8	15.7	21.9	5.32					
02-0362-4347	Mean Dry Biomass-mg	IC5	0.38	0.231	0.714	263	Linear Interpolation (ICPIN)				
		IC10	0.905	0.508	1.9	110					
		IC15	1.63	0.834	3.84	61.4					
		IC20	2.63	1.21	7.02	38					
		IC25	4.01	1.65	12.2	24.9					
		IC40	12.2	3.15	16.8	8.21					
		IC50	15.2	9.23	19.3	6.56					
7d Survival Rate Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	1	1	1	1	1	0	0	0.0%	0.0%
12.5		4	0.675	0.592	0.758	0.4	0.9	0.0405	0.222	32.8%	32.5%
25		4	0.475	0.411	0.539	0.3	0.7	0.0312	0.171	36.0%	52.5%
50		4	0	0	0	0	0	0	0	100.0%	
75		4	0	0	0	0	0	0	0	100.0%	
100		4	0	0	0	0	0	0	0	100.0%	
Mean Dry Biomass-mg Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	0.383	0.38	0.386	0.376	0.395	0.00149	0.00818	2.13%	0.0%
12.5		4	0.229	0.207	0.25	0.156	0.29	0.0106	0.0579	25.4%	40.4%
25		4	0.098	0.0812	0.115	0.049	0.147	0.0082	0.0449	45.8%	74.4%
50		4	0	0	0	0	0	0	0	100.0%	
75		4	0	0	0	0	0	0	0	100.0%	
100		4	0	0	0	0	0	0	0	100.0%	

CETIS Summary Report

Report Date:

22 Oct-09 12:16 (p 2 of 2)

Test Code:

07-9973-5767/36401

Chronic Larval Fish Survival and Growth Test											Pacific EcoRisk
Mean Dry Weight-mg Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	0.383	0.38	0.386	0.376	0.395	0.00149	0.00818	2.13%	0.0%
12.5		4	0.346	0.334	0.359	0.32	0.39	0.00599	0.0328	9.47%	9.62%
25		4	0.2	0.187	0.214	0.163	0.246	0.00655	0.0359	17.9%	47.7%
50		4	0	0	0	0	0	0	0		100.0%
75		4	0	0	0	0	0	0	0		100.0%
100		4	0	0	0	0	0	0	0		100.0%
7d Survival Rate Detail											
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
0	Lab Water Contr	1	1	1	1						
12.5		0.8	0.6	0.9	0.4						
25		0.7	0.5	0.3	0.4						
50		0	0	0	0						
75		0	0	0	0						
100		0	0	0	0						
Mean Dry Biomass-mg Detail											
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
0	Lab Water Contr	0.381	0.395	0.376	0.381						
12.5		0.256	0.212	0.29	0.156						
25		0.147	0.123	0.049	0.073						
50		0	0	0	0						
75		0	0	0	0						
100		0	0	0	0						
Mean Dry Weight-mg Detail											
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
0	Lab Water Contr	0.381	0.395	0.376	0.381						
12.5		0.32	0.353	0.322	0.39						
25		0.21	0.246	0.163	0.183						
50		0	0	0	0						
75		0	0	0	0						
100		0	0	0	0						

CETIS Analytical Report

Report Date:

22 Oct-09 12:14 (p 3 of 4)

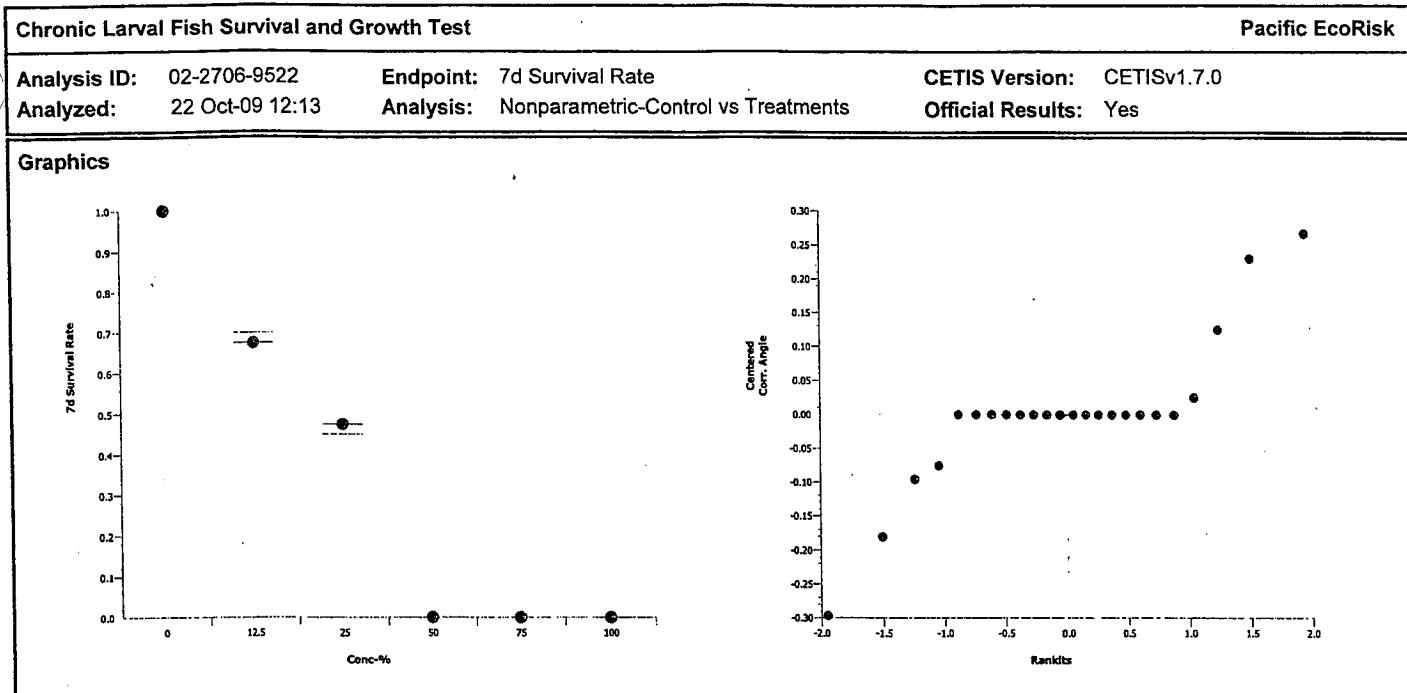
Test Code:

07-9973-5767/36401

Chronic Larval Fish Survival and Growth Test							Pacific EcoRisk				
Analysis ID: 02-2706-9522	Endpoint: 7d Survival Rate					CETIS Version: CETISv1.7.0					
Analyzed: 22 Oct-09 12:13	Analysis: Nonparametric-Control vs Treatments					Official Results: Yes					
Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU				
Angular (Corrected)	0	C > T	Not Run	<12.5	12.5	N/A	>8				
Steel Many-One Rank Test											
Control	vs	Conc-%	Test Stat	Critical	Ties	P-Value	Decision(5%)				
Lab Water Control		12.5*	10	10	0	0.0417	Significant Effect				
		25*	10	10	0	0.0417	Significant Effect				
		50*	10	10	0	0.0417	Significant Effect				
		75*	10	10	0	0.0417	Significant Effect				
		100*	10	10	0	0.0417	Significant Effect				
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)					
Between	5.658584	1.131717	5	73.6	<0.0001	Significant Effect					
Error	0.2768277	0.01537932	18								
Total	5.935412	1.147096	23								
ANOVA Assumptions											
Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)						
Variances	Mod Levene Equality of Variance	8.91	4.25	0.0002	Unequal Variances						
Distribution	Shapiro-Wilk Normality	0.762		<0.0001	Non-normal Distribution						
7d Survival Rate Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	1	1	1	1	1	0	0	0.0%	0.0%
12.5		4	0.675	0.591	0.759	0.4	0.9	0.0412	0.222	32.8%	32.5%
25		4	0.475	0.41	0.54	0.3	0.7	0.0317	0.171	36.0%	52.5%
50		4	0	0	0	0	0	0	0		100.0%
75		4	0	0	0	0	0	0	0		100.0%
100		4	0	0	0	0	0	0	0		100.0%
Angular (Corrected) Transformed Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Cont	4	1.41	1.41	1.41	1.41	1.41	0	0	0.0%	0.0%
12.5		4	0.982	0.887	1.08	0.685	1.25	0.0461	0.248	25.3%	30.5%
25		4	0.76	0.694	0.827	0.58	0.991	0.0326	0.175	23.1%	46.2%
50		4	0.159	0.159	0.159	0.159	0.159	0	0	0.0%	88.8%
75		4	0.159	0.159	0.159	0.159	0.159	0	0	0.0%	88.8%
100		4	0.159	0.159	0.159	0.159	0.159	0	0	0.0%	88.8%

CETIS Analytical Report

Report Date: 22 Oct-09 12:14 (p 4 of 4)
Test Code: 07-9973-5767/36401



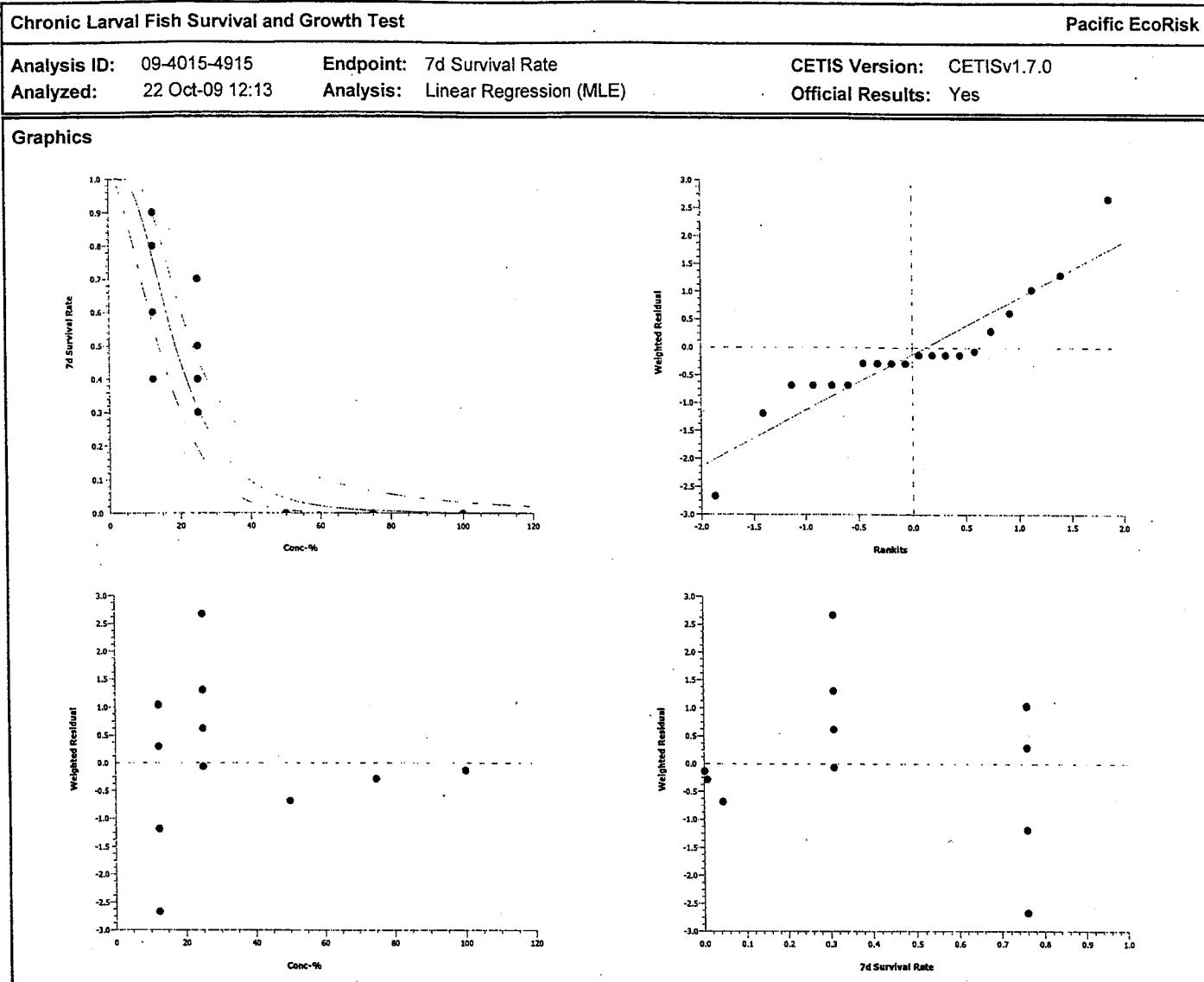
CETIS Analytical Report

Report Date: 22 Oct-09 12:14 (p 1 of 2)
 Test Code: 07-9973-5767/36401

Chronic Larval Fish Survival and Growth Test									Pacific EcoRisk																			
Analysis ID: 09-4015-4915	Endpoint: 7d Survival Rate								CETIS Version: CETISv1.7.0																			
Analyzed: 22 Oct-09 12:13 Analysis: Linear Regression (MLE) Official Results: Yes																												
Linear Regression Options																												
<table border="1"> <thead> <tr> <th>Model Function</th><th>Threshold Option</th><th>Threshold</th><th>Optimized Pooled</th><th>Het Corr</th><th>Weighted</th></tr> </thead> <tbody> <tr> <td>Log-Normal [NED=A+B*log(X)]</td><td>Control Threshold</td><td>0</td><td>Yes</td><td>No</td><td>No</td></tr> <tr> <td></td><td></td><td></td><td></td><td></td><td>Yes</td></tr> </tbody> </table>											Model Function	Threshold Option	Threshold	Optimized Pooled	Het Corr	Weighted	Log-Normal [NED=A+B*log(X)]	Control Threshold	0	Yes	No	No						Yes
Model Function	Threshold Option	Threshold	Optimized Pooled	Het Corr	Weighted																							
Log-Normal [NED=A+B*log(X)]	Control Threshold	0	Yes	No	No																							
					Yes																							
Regression Summary																												
Iters	LL	AICc	Mu	Sigma	G Stat	Chi-Sq	Critical	P-Value	Decision(5%)																			
7	-58.2	121	-0.0236	0.25	0.0704	21.2	28.9	0.2720	Non-Significant Heterogeneity																			
Point Estimates																												
Level	%	95% LCL	95% UCL	TU		95% LCL	95% UCL																					
EC5	7.29	4.66	9.59	13.7		10.4	21.5																					
EC10	8.98	6.15	11.4	11.1		8.78	16.3																					
EC15	10.3	7.41	12.8	9.67		7.8	13.5																					
EC20	11.6	8.57	14.1	8.64		7.09	11.7																					
EC25	12.7	9.71	15.3	7.85		6.53	10.3																					
EC40	16.2	13.2	19	6.16		5.26	7.59																					
EC50	18.8	15.7	21.9	5.32		4.58	6.38																					
Regression Parameters																												
Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat		P-Value	Decision(5%)																				
Slope	4	0.541	2.94	5.06	7.39		<0.0001	Significant Parameter																				
Intercept	-0.0944	0.747	-1.56	1.37	-0.126		0.9009	Non-Significant Parameter																				
Residual Analysis																												
Attribute	Method			Test Stat	Critical	P-Value	Decision(5%)																					
Variances	Mod Levene Equality of Variance			7.97	3.06	0.0012	Unequal Variances																					
Distribution	Shapiro-Wilk Normality			0.894		0.0318	Non-normal Distribution																					
7d Survival Rate Summary																												
Calculated Variate(A/B)																												
Conc-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	Diff%	A	B																	
0	Lab Water Contr	4	1	1	1	0	0	0.0%	0.0%	40	40																	
12.5		4	0.675	0.4	0.9	0.0405	0.222	32.8%	32.5%	27	40																	
25		4	0.475	0.3	0.7	0.0312	0.171	36.0%	52.5%	19	40																	
50		4	0	0	0	0	0		100.0%	0	40																	
75		4	0	0	0	0	0		100.0%	0	40																	
100		4	0	0	0	0	0		100.0%	0	40																	
7d Survival Rate Detail																												
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4																							
0	Lab Water Control	1	1	1	1																							
12.5		0.8	0.6	0.9	0.4																							
25		0.7	0.5	0.3	0.4																							
50		0	0	0	0																							
75		0	0	0	0																							
100		0	0	0	0																							

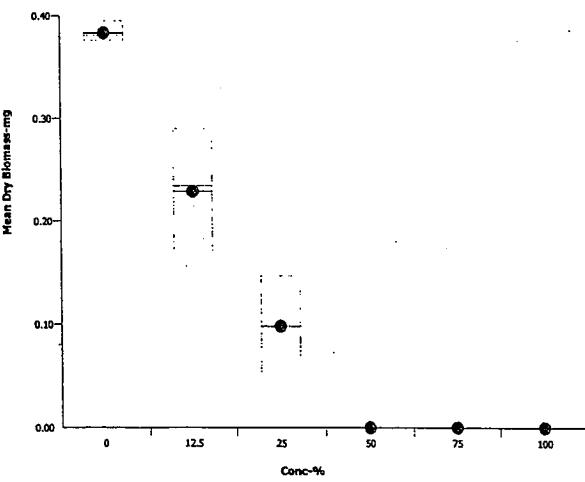
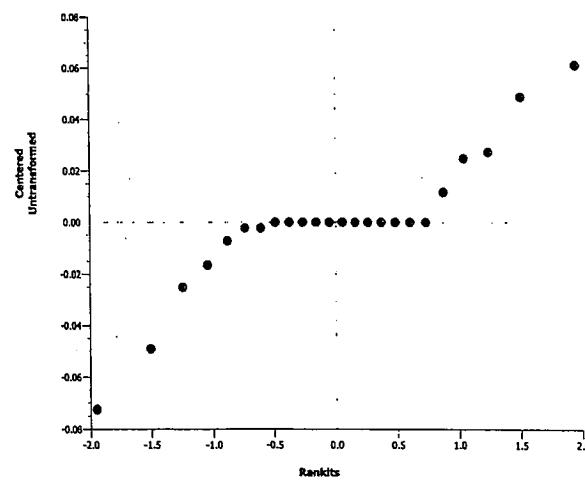
CETIS Analytical Report

Report Date: 22 Oct-09 12:14 (p 2 of 2)
Test Code: 07-9973-5767/36401



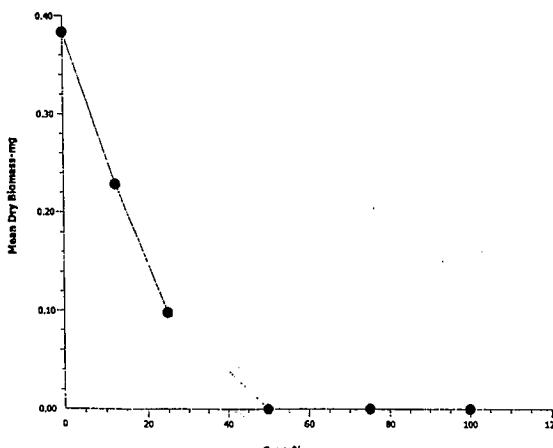
CETIS Analytical Report

Report Date: 22 Oct-09 12:14 (p 2 of 4)
 Test Code: 07-9973-5767/36401

Chronic Larval Fish Survival and Growth Test							Pacific EcoRisk				
Analysis ID: 12-8095-4102 Analyzed: 22 Oct-09 12:13	Endpoint: Mean Dry Biomass-mg Analysis: Nonparametric-Control vs Treatments				CETIS Version: CETISv1.7.0	Official Results: Yes					
Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD			
Untransformed	0	C > T	Not Run	<12.5	12.5	N/A	>8	13.4%			
Steel Many-One Rank Test											
Control	vs	Conc-%	Test Stat	Critical	Ties	P-Value	Decision(5%)				
Lab Water Control		12.5*	10	10	0	0.0417	Significant Effect				
		25*	10	10	0	0.0417	Significant Effect				
		50*	10	10	0	0.0417	Significant Effect				
		75*	10	10	0	0.0417	Significant Effect				
		100*	10	10	0	0.0417	Significant Effect				
ANOVA Table											
Source	Sum Squares		Mean Square		DF	F Stat	P-Value	Decision(5%)			
Between	0.4989575		0.09979151		5	110	<0.0001	Significant Effect			
Error	0.01631971		0.0009066507		18						
Total	0.5152773		0.1006982		23						
ANOVA Assumptions											
Attribute	Test		Test Stat	Critical	P-Value	Decision(1%)					
Variances	Mod Levene Equality of Variance		10.3	4.25	<0.0001	Unequal Variances					
Distribution	Shapiro-Wilk Normality		0.838		0.0013	Non-normal Distribution					
Mean Dry Biomass-mg Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	0.383	0.38	0.386	0.376	0.395	0.00152	0.00818	2.13%	0.0%
12.5		4	0.229	0.206	0.251	0.156	0.29	0.0108	0.0579	25.4%	40.4%
25		4	0.098	0.0809	0.115	0.049	0.147	0.00834	0.0449	45.8%	74.4%
50		4	0	0	0	0	0				100.0%
75		4	0	0	0	0	0				100.0%
100		4	0	0	0	0	0				100.0%
Graphics											
											

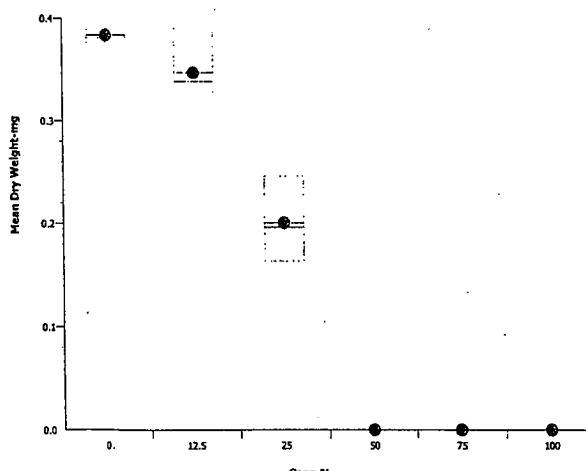
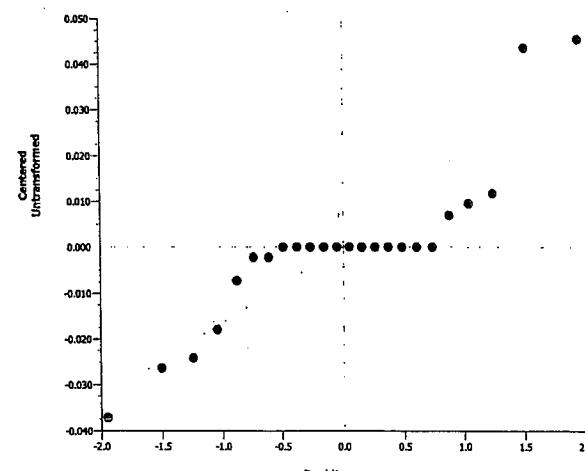
CETIS Analytical Report

Report Date: 22 Oct-09 12:14 (p 1 of 1)
Test Code: 07-9973-5767/36401

Chronic Larval Fish Survival and Growth Test						Pacific EcoRisk							
Analysis ID: 02-0362-4347 Analyzed: 22 Oct-09 12:13	Endpoint: Mean Dry Biomass-mg Analysis: Linear Interpolation (ICPIN)			CETIS Version: CETISv1.7.0 Official Results: Yes									
Linear Interpolation Options													
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method								
Log(X+1)	Linear	57951	200	Yes	Two-Point Interpolation								
Point Estimates													
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL							
IC5	0.38	0.231	0.714	263	140	432							
IC10	0.905	0.508	1.9	110	52.8	197							
IC15	1.63	0.834	3.84	61.4	26.1	120							
IC20	2.63	1.21	7.02	38	14.3	82.3							
IC25	4.01	1.65	12.2	24.9	8.2	60.7							
IC40	12.2	3.15	16.8	8.21	5.94	31.7							
IC50	15.2	9.23	19.3	6.56	5.18	10.8							
Mean Dry Biomass-mg Summary				Calculated Variate									
Conc-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	Diff%				
0	Lab Water Contr	4	0.383	0.376	0.395	0.00149	0.00818	2.13%	0.0%				
12.5		4	0.229	0.156	0.29	0.0106	0.0579	25.4%	40.4%				
25		4	0.098	0.049	0.147	0.0082	0.0449	45.8%	74.4%				
50		4	0	0	0	0	0		100.0%				
75		4	0	0	0	0	0		100.0%				
100		4	0	0	0	0	0		100.0%				
Mean Dry Biomass-mg Detail													
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4								
0	Lab Water Control	0.381	0.395	0.376	0.381								
12.5		0.256	0.212	0.29	0.156								
25		0.147	0.123	0.049	0.073								
50		0	0	0	0								
75		0	0	0	0								
100		0	0	0	0								
Graphics													
													

CETIS Analytical Report

Report Date: 22 Oct-09 12:14 (p 1 of 4)
 Test Code: 07-9973-5767/36401

Chronic Larval Fish Survival and Growth Test							Pacific EcoRisk				
Analysis ID:	10-8855-6617	Endpoint: Mean Dry Weight-mg			CETIS Version: CETISv1.7.0						
Analyzed:	22 Oct-09 12:13	Analysis: Nonparametric-Control vs Treatments				Official Results: Yes					
Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD			
Untransformed	0	C > T	Not Run	12.5	25	17.7	8	8.94%			
Steel Many-One Rank Test											
Control	vs	Conc-%	Test Stat	Critical	Ties	P-Value	Decision(5%)				
Lab Water Control		12.5	13	10	0	0.2311	Non-Significant Effect				
		25*	10	10	0	0.0417	Significant Effect				
		50*	10	10	0	0.0417	Significant Effect				
		75*	10	10	0	0.0417	Significant Effect				
		100*	10	10	0	0.0417	Significant Effect				
ANOVA Table											
Source	Sum Squares		Mean Square	DF	F Stat	P-Value	Decision(5%)				
Between	0.6514781		0.1302956	5	321	<0.0001	Significant Effect				
Error	0.007296769		0.000405376	18							
Total	0.6587748		0.130701	23							
ANOVA Assumptions											
Attribute	Test		Test Stat	Critical	P-Value	Decision(1%)					
Variances	Mod Levene Equality of Variance		6.23	4.25	0.0016	Unequal Variances					
Distribution	Shapiro-Wilk Normality		0.816		0.0005	Non-normal Distribution					
Mean Dry Weight-mg Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	0.383	0.38	0.386	0.376	0.395	0.00152	0.00818	2.13%	0.0%
12.5		4	0.346	0.334	0.359	0.32	0.39	0.00609	0.0328	9.47%	9.62%
25		4	0.2	0.187	0.214	0.163	0.246	0.00667	0.0359	17.9%	47.7%
50		4	0	0	0	0	0	0	0		100.0%
75		4	0	0	0	0	0	0	0		100.0%
100		4	0	0	0	0	0	0	0		100.0%
Graphics											
											

7 Day Chronic Fathead Minnow Toxicity Test Data

Client: Precision Analytical - Chevron Cawelo Organism Log#: 4783 Age: <48 hrs
 Test Material: Inlet to Res B Organism Supplier: ABS
 Test ID#: 36401 Project #: 15239 Control/Diluent: EPAMH
 Test Date: 9/22/09 Randomization: 4.6.5 Control Water Batch: 1249

Treatment (% Effluent)	Temp (°C)	pH		D.O. (mg/L)		Conductivity (µS/cm)	# Live Organisms				SIGN-OFF
		new	old	new	old		A	B	C	D	
Lab Water Control	25.7	7.98		9.0		315	10	10	10	10	Date: <u>9/22/09</u> Sample ID: <u>22772</u> Test Solution Prep: <u>SN</u> New WQ: <u>MJM</u> Initiation Time: <u>1820</u> Initiation Signoff: <u>KO</u>
12.5%	25.7	7.48		8.2		378	10	10	10	10	
25%	25.7	7.53		8.0		436	10	10	10	10	
50%	25.7	7.36		7.7		541	10	10	10	10	
75%	25.7	7.24		7.5		658	10	10	10	10	
100%	25.7	7.12		7.1		770	10	10	10	10	
Meter ID	22A	pH111		D012		Eco4					
Lab Water Control	25.8	8.12	8.21	9.8	8.2	369	10	10	10	10	Date: <u>9/23/09</u> Sample ID: <u>22772</u> Test Solution Prep: <u>JW</u> New WQ: <u>JKM</u> Renewal Time: <u>1210</u> Renewal Signoff: <u>KO</u>
12.5%	25.8	8.01	8.18	8.7	8.1	424	10	10	10	10	
25%	25.8	7.71	8.17	8.7	8.2	474	10	10	10	10	
50%	25.8	7.42	8.21	8.8	8.0	575	10	10	10	10	
75%	25.8	7.30	8.25	8.5	8.1	671	7	9	8	9	
100%	25.8	7.17	8.29	8.4	8.3	773	8	6	6	4	
Meter ID	22A	pH111	pH111	D012	D013	Eco3					Old WQ: <u>MJM</u>
Lab Water Control	25.7	7.90	7.83	8.8	8.79	365	10	10	10	10	Date: <u>9/24/09</u> Sample ID: <u>22772</u> Test Solution Prep: <u>PA</u> New WQ: <u>MJM</u> Renewal Time: <u>1030</u> Renewal Signoff: <u>ZW</u>
12.5%	25.7	7.87	8.04	8.7	7.7	419	10	10	10	6	
25%	25.7	7.79	8.04	8.9	7.6	470	10	10	10	10	
50%	25.7	7.69	8.10	8.9	7.7	572	7	10	10	10	
75%	25.7	7.41	8.18	8.5	7.8	676	7	9	8	7	
100%	25.7	7.26	8.11	8.2	7.8	783	0	0	1	0	
Meter ID	22A	pH111	pH111	D012	D012	Eco4					Old WQ: <u>MJM</u>
Lab Water Control	25.8	8.12	8.02	7.8	7.4	360	10	10	10	10	Date: <u>9/25/09</u> Sample ID: <u>22772</u> Test Solution Prep: <u>JW</u> New WQ: <u>MJM</u> Renewal Time: <u>1525</u> Renewal Signoff: <u>ZW</u>
12.5%	25.8	7.82	8.07	8.1	7.3	423	10	10	10	10	
25%	25.8	7.73	8.15	8.1	7.3	461	10	10	10	10	
50%	25.8	7.59	8.21	8.1	7.3	556	7	10	9	9	
75%	25.8	7.35	8.18	7.8	7.2	664	0	2	4	2	
100%	25.8	7.20	8.19	7.8	7.0	770	-	-	0	-	
Meter ID	22A	pH111	pH111	D013	D013	Eco4					Old WQ: <u>MJM</u>

7 Day Chronic Fathead Minnow Toxicity Test Data

Client: Precision Analytical - Chevron Cawelo
 Test Material: Inlet to Res B
 Test ID#: 36401 Project #: 15239
 Test Date: 9-12-09 Randomization: 465
 Organism Log#: 4783 Age: 24 hrs
 Organism Supplier: A-B-S
 Control/Diluent: EPAMH
 Control Water Batch: 1244

Treatment (% Effluent)	Temp (°C)	pH		D.O. (mg/L)		Conductivity (µs/cm)	# Live Organisms				SIGN-OFF
		new	old	new	old		A	B	C	D	
Lab Water Control	25.9	8.27	7.71	8.7	7.4	368	10	10	10	10	Date: 9/12/09 Sample ID: 22772 Test Solution Prep: ,pc New WQ: e.d. Renewal Time: 1200 Renewal Signoff: JC Old WQ: e.d.
12.5%	25.9	7.55	7.73	8.7	6.6	425	10	9	9	9	
25%	25.9	7.28	7.81	8.8	6.8	465	9	8	10	10	
50%	25.9	7.12	7.89	8.9	7.0	574	3	7	3	5	New WQ: e.d. Renewal Time: 1200 Renewal Signoff: JC
75%	25.9	7.06	7.90	9.0	6.9	668	-	0	0	0	
100%	-	-	-	-	-	-	-	-	-	-	
Meter ID	22A	pH03	pH03	D013	D013	EC03					
Lab Water Control	25.9	7.97	8.12	9.0	7.7	310	10	10	10	10	Date: 9/12/09 Sample ID: 22772 Test Solution Prep: ,pc New WQ: BH Renewal Time: 1045 Renewal Signoff: JP Old WQ: BH
12.5%	25.9	7.99	8.01	8.9	7.7	391/323	10	8	8	8	
25%	25.9	7.80	7.95	9.0	7.9	434/304	9	6	7	7	
50%	25.9	7.69	7.89	9.1	7.4	572/375	1	0	0	2	New WQ: BH Renewal Time: 1045 Renewal Signoff: JP Old WQ: BH
75%	-	-	-	-	-	-	-	-	-	-	
100%	-	-	-	-	-	-	-	-	-	-	
Meter ID	22A	pH09	pH09	D013	D013	EC04					
Lab Water Control	26.0	8.03	7.73	8.4	7.9	303	10	10	10	10	Date: 9/12/09 Sample ID: 22772 Test Solution Prep: ,pc New WQ: BH Renewal Time: 1045 Renewal Signoff: JP Old WQ: BH
12.5%	26.0	7.91	8.01	8.5	8.0	359	8	7	9	6	
25%	26.0	7.82	8.11	8.7	7.9	420	8	6	4	4	
50%	26.0	7.54	8.11	8.9	7.9	535	0	-	-	1	New WQ: BH Renewal Time: 1045 Renewal Signoff: JP Old WQ: BH
75%	-	-	-	-	-	-	-	-	-	-	
100%	-	-	-	-	-	-	-	-	-	-	
Meter ID	22A	pH09	pH14	D04	D052	EC04					
Lab Water Control	25.3		8.14		7.1	307	10	10	10	10	Date: 9/12/09 Termination Time: 0945 Termination Signoff: ,pc Old WQ: BH
12.5%	25.3		8.04		7.2	367	8	6	9	4	
25%	25.3		8.02		7.4	427	7	5	3	4	
50%	25.3		8.05		7.4	543	-	-	-	0	
75%	-		-		-	-	-	-	-	-	
100%	-		-		-	-	-	-	-	-	
Meter ID	22A		pH14		D012	EC04					

Fathead Minnow Dry Weight Data Sheet

Client: Precision Analytical - Chevron Cawelo Test ID #: 36401 Project # 15239
 Sample: Inlet to Res B Tare Weight Date: 9/29/09 Sign-off: YK
 Test Date: 9/22/09 Final Weight Date: 10/7/09 Sign-off: DED

Pan ID	Concentration Replicate	Initial Pan Weight (mg)	Final Pan Weight (mg)	Initial # of Organisms	Biomass Value (mg)
1	Lab Water A	173.77	177.58	10	0.381
2	B	183.31	187.26	10	0.295
3	C	152.76	156.52	10	0.376
4	D	159.95	163.76	10	0.381
5	12.5 A	154.37	156.93	10	0.256
6	B	155.23	157.33	10	0.212
7	C	166.81	169.71	10	0.206
8	D	164.03	165.59	10	0.156
9	25 A	152.28	153.75	10	0.147
10	B	153.38	155.01	10	0.123
11	C	155.14	155.63	10	0.049
12	D	157.65	158.38	10	0.073
13	50 A	154.60	-	10	0
14	B	154.89	-	10	0
15	C	174.52	-	10	0
16	D	156.75	-	10	0
17	75 A	152.24	-	10	0
18	B	186.37	-	10	0
19	C	160.13	-	10	0
20	D	168.26	-	10	0
21	100 A	152.57	-	10	0
22	B	165.64	-	10	0
23	C	174.91	-	10	0
24	D	150.63	-	10	0
QA 1		156.75	156.84		
QA 2		150.96	150.92		
Balance ID		1	1		

Appendix E

Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the Fathead Minnows

CETIS Summary Report

Report Date:

Test Code:

2009-09-23 (P 1 of 2)

06-7053-2309/36323

Chronic Larval Fish Survival and Growth Test								Pacific EcoRisk			
Batch ID:	07-4776-9886	Test Type:	Growth-Survival (7d)		Analyst:	Drew Gantner					
Start Date:	22 Sep-09 18:55	Protocol:	EPA-821-R-02-013 (2002)		Diluent:	Laboratory Water					
Ending Date:	29 Sep-09 08:50	Species:	Pimephales promelas		Brine:	Not Applicable					
Duration:	6d 14h	Source:	Enviro Sciences, Inc.		Age:	1					
Sample ID:	08-8210-7461	Code:	NaCl		Client:	Reference Toxicant					
Sample Date:	22 Sep-09 18:55	Material:	Sodium chloride		Project:	15221					
Receive Date:	22 Sep-09 18:55	Source:	Reference Toxicant								
Sample Age:	N/A (25.7 °C)	Station:	In House								
Comparison Summary											
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method				
20-4381-2651	7d Survival Rate	3	6	4.24	46.0%		Dunnett's Multiple Comparison Test				
18-7708-3967	Mean Dry Biomass-mg	1.5	3	2.12	22.0%		Dunnett's Multiple Comparison Test				
18-3392-2764	Mean Dry Weight-mg	6	>6	N/A	57.6%		Bonferroni Adj t Test				
Point Estimate Summary											
Analysis ID	Endpoint	Level	g/L	95% LCL	95% UCL	TU	Method				
11-0850-3106	7d Survival Rate	EC5	2.46	1.35	3.22		Linear Regression (MLE)				
		EC10	2.79	1.67	3.54						
		EC15	3.04	1.92	3.78						
		EC20	3.26	2.14	3.98						
		EC25	3.45	2.35	4.17						
		EC40	3.99	2.96	4.7						
		EC50	4.36	3.39	5.08						
00-6217-7498	Mean Dry Biomass-mg	IC5	1.66	1.45	1.74		Linear Interpolation (ICPIN)				
		IC10	1.83	1.63	2.01						
		IC15	2.02	1.8	2.32						
		IC20	2.21	1.95	2.65						
		IC25	2.42	2.08	3						
		IC40	3.15	2.49	4.03						
		IC50	3.83	2.94	5.33						
04-1898-8948	Mean Dry Weight-mg	IC5	2.52	N/A	N/A		Linear Interpolation (ICPIN)				
		IC10	>6	N/A	N/A						
		IC15	>6	N/A	N/A						
		IC20	>6	N/A	N/A						
		IC25	>6	N/A	N/A						
		IC40	>6	N/A	N/A						
		IC50	>6	N/A	N/A						
7d Survival Rate Summary											
Conc-g/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	0.75	0.685	0.815	0.5	0.9	0.0316	0.173	23.1%	0.0%
0.75		4	0.825	0.806	0.844	0.8	0.9	0.00913	0.05	6.06%	-10.0%
1.5		4	0.8	0.694	0.906	0.4	1	0.0516	0.283	35.4%	-6.67%
3		4	0.65	0.572	0.728	0.4	0.9	0.038	0.208	32.0%	13.3%
6		4	0.175	0.128	0.222	0	0.3	0.023	0.126	71.9%	76.7%
9		4	0	0	0	0	0	0	0		100.0%
Mean Dry Biomass-mg Summary											
Conc-g/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	0.252	0.241	0.264	0.222	0.294	0.00551	0.0302	12.0%	0.0%
0.75		4	0.282	0.277	0.287	0.269	0.296	0.0023	0.0126	4.48%	-11.8%
1.5		4	0.283	0.274	0.292	0.248	0.298	0.0043	0.0236	8.33%	-12.2%
3		4	0.17	0.159	0.181	0.138	0.206	0.00514	0.0282	16.6%	32.6%
6		4	0.07	0.0491	0.0909	0	0.128	0.0102	0.056	79.9%	72.2%
9		4	0	0	0	0	0	0	0		100.0%

CETIS Summary Report

Report Date:

26 Oct-09 16:03 (p 2 of 2)

Test Code:

06-7053-2309/36323

Chronic Larval Fish Survival and Growth Test											Pacific EcoRisk
Mean Dry Weight-mg Summary											
Conc-g/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	0.352	0.315	0.389	0.278	0.498	0.0182	0.0995	28.3%	0.0%
0.75		4	0.342	0.335	0.35	0.321	0.37	0.00373	0.0204	5.97%	2.65%
1.5		4	0.395	0.337	0.452	0.29	0.62	0.0282	0.155	39.2%	-12.1%
3		4	0.28	0.246	0.315	0.197	0.408	0.0169	0.0927	33.1%	20.3%
6		3	0.396	0.351	0.44	0.265	0.495	0.0216	0.118	29.9%	-12.4%
7d Survival Rate Detail											
Conc-g/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
0	Lab Water Contr	0.8	0.5	0.9	0.8						
0.75		0.9	0.8	0.8	0.8						
1.5		0.8	1	1	0.4						
3		0.6	0.7	0.9	0.4						
6		0.2	0	0.2	0.3						
9		0	0	0	0						
Mean Dry Biomass-mg Detail											
Conc-g/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
0	Lab Water Contr	0.244	0.249	0.294	0.222						
0.75		0.289	0.274	0.269	0.296						
1.5		0.296	0.29	0.298	0.248						
3		0.173	0.138	0.206	0.163						
6		0.053	0	0.099	0.128						
9		0	0	0	0						
Mean Dry Weight-mg Detail											
Conc-g/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
0	Lab Water Contr	0.305	0.498	0.327	0.278						
0.75		0.321	0.342	0.336	0.37						
1.5		0.37	0.29	0.298	0.62						
3		0.288	0.197	0.229	0.408						
6		0.265	0.495	0.427							

7 Day Chronic Fathead Minnow Reference Toxicant Test Data

Client: Reference Toxicant Organism Log #: 4783 Age: <48
 Test Material: Sodium Chloride Organism Supplier: AB5
 Test ID #: 36323 Project #: 15221 Control/Diluent: EPAMH
 Test Date: 5/22/09 Randomization: 46-2 Control Water Batch: 1244

Treatment (g/L)	Temp (°C)	pH		D.O. (mg/L)		Conductivity (µs/cm)	# Live Organisms				SIGN-OFF
		New	Old	New	Old		A	B	C	D	
Control	25.7	8.64		8.7		316	10	10	10	10	Date: <u>9/22/09</u>
0.75	25.7	8.41		8.4		MJM 11812	10	10	10	10	Test Solution Prep: <u>KO</u>
1.5	25.7	8.31		9.2		3180	10	10	10	10	New WQ: <u>MJM</u>
3	25.7	8.24		9.1		5990	10	10	10	10	Initiation Time: <u>1855</u>
6	25.7	8.17		9.5		10960	10	10	10	10	Initiation Signoff: <u>KO</u>
9	25.7	8.11		9.9		15420	10	10	10	10	RT Stock Batch #: <u>29</u>
Meter ID	22A	pH11		D012		Eco4					
Control	25.8	7.90	8.46	10.0	8.9	369	9	9	9	9	Date: <u>9.23.09</u>
0.75	25.8	7.97	8.26	9.6	8.5	1950	10	10	9	10	Test Solution Prep: <u>JKL</u>
1.5	25.8	8.07	8.18	9.5	8.4	3300	10	10	10	10	New WQ: <u>JKL</u>
3	25.8	8.08	8.10	9.6	8.4	5940	10	10	10	10	Renewal Time: <u>1600</u>
6	25.8	8.04	8.02	9.8	8.3	10880	10	9	8	10	Renewal Signoff: <u>JPL</u>
9	25.8	7.99	7.99	10.4	8.4	15730	0	0	0	0	Old WQ: <u>JKL</u>
Meter ID	22A	pH11	pH11	D013	D013	Eco4					RT Stock Batch #: <u>29</u>
Control	25.7	7.99	8.09	8.8	7.7	362	7	9	8		Date: <u>9/24/09</u>
0.75	25.7	8.09	8.01	8.7	7.7	1805	9	10	9	10	Test Solution Prep: <u>JL</u>
1.5	25.7	8.08	8.00	8.9	7.6	3170	10	10	10	7	New WQ: <u>JKM</u>
3	25.7	8.05	7.97	9.1	7.7	5860	10	10	10	10	Renewal Time: <u>1120</u>
6	25.7	7.97	7.90	9.8	7.8	10970	8	4	4	7	Renewal Signoff: <u>JKL</u>
9	-	-	-	-	-	-	-	-	-	-	Old WQ: <u>JKM</u>
Meter ID	22A	pH11	pH11	D012	D012	Eco4					RT Stock Batch #: <u>29</u>
Control	25.8	7.99	7.78	9.4	7.3	355	8	5	9	8	Date: <u>9/25/09</u>
0.75	25.8	8.04	7.87	8.4	7.2	1837	9	10	9	9	Test Solution Prep: <u>JL</u>
1.5	25.8	8.01	7.85	8.4	7.2	3170	8	10	10	7	New WQ: <u>JKM</u>
3	25.8	8.07	7.83	8.4	7.2	5880	9	10	10	8	Renewal Time: <u>1530</u>
6	25.8	8.01	7.75	8.3	7.2	10820	6	1	4	7	Renewal Signoff: <u>JPL</u>
9	-	-	-	-	-	-	-	-	-	-	Old WQ: <u>JKM</u>
Meter ID	22A	pH11	pH11	D013	D013	Eco4					RT Stock Batch #: <u>30</u>

7 Day Chronic Fathead Minnow Reference Toxicant Test Data

Client: Reference Toxicant Organism Log#: 4783 Age: <48 hrs
 Test Material: Sodium Chloride Organism Supplier: AAS
 Test ID#: 36323 Project #: 15221 Control/Diluent: EPAMH
 Test Date: 9/22/09 Randomization: 4.6.2 Control Water Batch: 1244

Treatment (g/L)	Temp (°C)	pH		D.O. (mg/L)		Conductivity (µS/cm)	# Live Organisms				SIGN-OFF
		new	old	new	old		A	B	C	D	
Control	26.0	8.11	7.89	9.0	7.2	349	8	5	9	8	Date: <u>9/26/09</u>
0.75	26.0	8.14	7.82	9.1	7.4	2220	9	10	9	9	Test Solution Prep: <u>8m</u>
1.5	26.0	8.11	7.77	9.2	7.1	3037	8	10	10	7	New WQ: <u>el.</u>
3	26.0	8.05	7.80	9.1	7.3	6005	9	10	9	7	Renewal Time: <u>1400</u>
6	26.0	7.97	7.70	9.3	7.4	10,093	2	0	2	3	Renewal Signoff: <u>JPC</u>
9	-	-	-	-	-	-	-	-	-	Old WQ: <u>el.</u>	
Meter ID	22A	pH03	pH07	DO13	DO13	ECD3					RT Stock Batch #: <u>30</u>
Control	25.9	7.97	8.25	8.7	8.1	335	8	5	9	8	Date: <u>9/27/09</u>
0.75	25.9	7.94	8.14	8.6	8.4	1927	9	10	8	9	Test Solution Prep: <u>8m</u>
1.5	25.9	7.97	8.01	8.5	8.1	3210	8	10	10	5	New WQ: <u>8m</u>
3	25.9	7.98	7.95	8.5	8.4	5820	9	9	9	6	Renewal Time: <u>0950</u>
6	25.9	7.93	7.95	8.6	8.2	10990	2	-	2	3	Renewal Signoff: <u>8m</u>
9	-	-	-	-	-	-	-	-	-	Old WQ: <u>8m</u>	
Meter ID	22A	pH03	pH09	DO14	DO13	ECD5					RT Stock Batch #: <u>30</u>
Control	26.0	8.08	7.91	8.4	7.9	298	8	5	9	8	Date: <u>9/28/09</u>
0.75	26.0	8.07	7.94	8.2	7.9	1998	9	8	8	9	Test Solution Prep: <u>m</u>
1.5	26.0	8.08	7.91	8.3	7.9	3380	8	10	10	5	New WQ: <u>m</u>
3	26.0	8.06	7.95	8.6	8.0	5810	8	9	9	6	Renewal Time: <u>1100</u>
6	26.0	8.02	7.97	8.9	7.9	10870	2	-	2	3	Renewal Signoff: <u>m</u>
9	-	-	-	-	-	-	-	-	-	Old WQ: <u>8m</u>	
Meter ID	22A	pH09	pH14	DO14	DO12	ECD4					RT Stock Batch #: <u>30</u>
Control	25.3		8.60		7.9	325	8	5	9	8	Date: <u>9/29/09</u>
0.75	25.3		8.27		7.7	2064	9	8	8	8	Termination Time: <u>1090850</u>
1.5	25.3		8.16		7.6	3440	8	10	10	4	Termination Signoff: <u>m</u>
3	25.3		8.08		7.6	5930	6	7	9	4	Old WQ: <u>8m</u>
6	25.3		7.99		7.4	11240	2	-	2	3	
9	-		-		-	-	-	-	-		
Meter ID	22A		ph14		DO12	ECD4					

Fathead Minnow Dry Weight Data Sheet

Client: Reference Toxicant Test ID #: 36323 Project # 15221
 Sample: Sodium Chloride Tare Weight Date: 4/24/09 Sign-off: vn
 Test Date: 9/22/09 Final Weight Date: 10/3/09 Sign-off: vn

Pan ID	Concentration Replicate	Initial Pan Weight (mg)	Final Pan Weight (mg)	Initial # of Organisms	Biomass Value (mg)
1	Control A	149.33	151.77	10	0.244
2	B	163.14	165.68	10	0.249
3	C	165.69	168.63	10	0.294
4	D	155.64	157.86	10	0.220
5	0.75 A	180.03	182.92	10	0.289
6	B	139.38	142.12	10	0.274
7	C	145.09	147.78	10	0.269
8	D	177.21	180.17	10	0.296
9	1.5 A	179.58	182.54	10	0.296
10	B	145.33	148.23	10	0.290
11	C	151.68	154.66	10	0.298
12	D	166.40	168.88	10	0.248
13	3 A	170.43	172.16	10	0.173
14	B	148.92	150.30	10	0.138
15	C	171.84	173.90	10	0.206
16	D	176.84	178.47	10	0.163
17	6 A	163.35	163.88	10	0.053
18	B	162.05	—	10	0.000
19	C	161.60	161.99	10	0.099
20	D	162.86	164.14	10	0.128
21	9 A	151.46	—	10	0.000
22	B	169.29	—	10	0.000
23	C	169.75	—	10	0.000
24	D	171.56	—	10	0.000
QA1		166.73	166.77		0.040
QA2		178.25	178.30		0.050
QA3		164.09	164.26		0.170
Balance ID:		1	1		